Differences in Coronary Heart Disease Risk Markers among Apparently Healthy Individuals of African Ancestry

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Objective: This study identified and compared coronary heart disease (CHD) risk factors among foreign-born Afro Caribbeans (FBAC), U.S.-born Afro-Caribbean Americans (USBAC) and African Americans.

Methods: Sixty-six FBAC living in the United States for <10 years, 62 USBAC and 61 African-American adults (18–40 years) were recruited. Sociodemographic, behavioral and biochemical data were collected and analyzed.

Results: More USBAC (26.2%) and African-American (23.7%) participants compared to the FBAC (10.8%) participants had significantly ($p<0.05$) poorer diet scores and were significantly ($p<0.05$) more obese (17.7% and 23.0% vs. 7.6%). These differences remained significant between the male ethnic groups but not the females. Also, more USBAC and African-American participants compared to FBAC participants watched television often/very often (54.8% and 49.2% vs. 45.5%), played less sports (56.5% and 55.7% vs. 40.9%) and smoked cigarettes (4.8% and 6.6% vs. 0.0%). In general, USBAC and African-American participants were more likely to have elevated blood glucose (BG), total cholesterol (TC), low-density-lipoprotein cholesterol (LDL-C) and high-sensitivity C-reactive protein (hs-CRP) levels compared to FBAC participants. More FBAC than USBAC and African-American participants had elevated blood pressure (BP) and low levels of high-density-lipoprotein cholesterol (HDL-C). However, the differences were not significant.

Conclusion: This study demonstrated that there are differences in risk factors for CHD among ethnic groups (FBAC, USBAC and African-American participants) of persons with African ancestory.

Key words: coronary heart disease ■ risk factors ■ race/ethnicity ■ African Americans

© 2007. From Stempel School of Public Health, Department of Dietetics and Nutrition, Florida International University, Miami, FL. Send correspondence and reprint requests for *J Natl Med Assoc.* 2007;99:658–664 to: Dr. Fatma G. Huffman, Stempel School of Public Health, Department of Dietetics and Nutrition, Florida International University, 11200 SW Eighth St., Miami, FL 33199; phone: (305) 348-3788; fax: (305) 348-1996; e-mail: huffmanf@fiu.edu

INTRODUCTION

Cardiovascular disease (CVD) is a serious public health concern in the United States, affecting >71 million Americans in 2003.[1] Since >53% of all CVD deaths are due to coronary heart disease (CHD), modification of the risk factors for CHD is important in the prevention of CHD.[1] However, despite behavior/lifestyle changes and the use of new pharmacological drug therapies to decrease blood cholesterol[2] and blood pressure levels,[3] CVD remains the leading cause of death in the United States,[4] accounting for nearly 1 million deaths and >6 million hospital discharges in 2003, exacting a heavy burden on black males and females.[1] The incidence and prevalence of CVD will continue to increase as the population ages and, together, may become one of the leading causes of disability-adjusted life years (DALYs) lost among working adults.[5] Nationally, the annual estimated direct and indirect cost of CVD in 2006 was >$403 billion.[1] The current approach to the prevention of CHD is predicated on identification of risk factors and the quantitative assessment of short-term cardiovascular risk.[6] In the absence of these risk factors, death from CHD is rare.[5]

There is evidence showing lower all-cause mortality due to CHD in foreign-born blacks compared to U.S.-born blacks and U.S.-born whites.[7-9] Studies in New York[9] also showed that Caribbean Americans in New York City had substantially lower all-cause and cardiovascular mortality rates compared to blacks born in the southern and northeastern United States. However, risk factors for CHD were not investigated in this study. No study has been done to evaluate the risk factors of CHD in FBAC and USBAC, especially in south Florida, where there is a growing population. FBAC may have different health perceptions, beliefs, behaviors and propensities to report health/nutritional conditions compared to USBAC and African Americans. These differences may be distinguishing features of these groups and may influence biochemical risk factors for cardiovascular disease in this population of African ancestry.[10] Our concern was the use of the term "African American" or "black" to refer to all black people living in the United States. Such broad categorization of individuals does not take into consideration the existence of subgroups/cultures within this black population. Thus, the purpose of this study was to identify and compare CHD risk factors among three black ethnic groups (FBAC, USBAC, African Americans) in south Florida.

METHODS

Subject Recruitment and Assignment

We used a convenience sample of 189 individuals 18–40 years old from three black ethnic groups, FBAC (31 males, 35 females), USBAC (30 males, 32 females) and African Americans (30 males, 31 females) in a cross-sectional research design. The study participants were recruited from Miami-Dade and Broward counties in south Florida. Individuals from the Caribbean, Caribbean American and African-American populations were recruited. There is 85% power in a 2x3 analysis of variance (ANOVA) to detect a medium-sized (d=0.25) main effect or interaction with a 0.05 significance level using sample sizes of 60 respondents for each of the three ethnic groups. Based on the previous assumptions, the total sample size was 180 individuals (30 males, 30 females) from each of the three ethnic groups. In this study, risks of CHD for the age range 18–40 years were considered low (NCEP: ATP III, 2001). Also, risks of CHD for both gender groups were assumed to be similar (NCEP: ATP III, 2001) and, thus, equal numbers of males and females were recruited. However, the actual number of subjects recruited for the study is as indicated above. The places of birth of participants and their parents were requested at the initial screening interview. Also, participants were selected for the study if they were not diagnosed with any of the following medical conditions: cancer, cardiomyopathy, gout, migraine, peptic ulcer, psychiatric, renal, thyroid and hepatic diseases (self-reported); not taking over the counter herbal or prescription medications (anti-inflammatory agents, antiasthmatics, antidepressants, anticonvulsives); not pregnant; not chronic alcohol users [≥3 drinks per day or per sitting; one drink was defined as: 12 oz of 4.5% beer, 4–5 oz of 14% wine, 10 oz. wine cooler, 1–1.5 oz distilled liquor (80% proof whiskey, scotch, rum, vodka]; and willing to sign the informed consent form. Individuals who were interested in the study were asked to report on a specified day, in an overnight fasting state, to the Human Nutrition Research Laboratory at the Department of Dietetics and Nutrition at Florida International University (FIU). When the participants visited our laboratory, they were given an opportunity to review the study materials, ask questions and decide if they wanted to participate in the study. Those who decided to participate in the study, after meeting the inclusion criteria, were asked to sign an informed consent form approved by the institutional review board (IRB) at FIU. Participants were surveyed only once. We classified participants as FBAC if they were born in one of the Caribbean islands and residing in the United States for <10 years, USBAC if they were born in the United States to both Caribbean-born par-

Table 1. Sociodemographic factors of the participants by ethnicity and gender

Variables	FBAC*	USBAC†	African Americans	p
	N=M31/F35	N=M30/F32	N=M30/F31	
Age (Mean ± SD)				
Combined	24.4 ± 5.8^{ab}	21.6 ± 3.8^{b}	25.4 ± 5.1^{a}	**0.002**
Males	24.5 ± 5.8^{ab}	21.6 ± 3.6^{b}	25.5 ± 5.4^{a}	**0.009**
Females	24.2 ± 6.0	21.7 ± 4.0	23.4 ± 4.5	0.107
College/Graduate Studies (%)				
Combined	33.3	17.7	29.5	0.120
Males	36.8	16.7	30.0	0.428
Females	28.6	18.7	29.1	0.564
Household Income >$20,000 (%)				
Combined	54.5	61.3	54.1	0.673
Males	48.4	66.7	60.0	0.247
Females	60.0	56.2	48.3	0.812
Medical Insurance (Yes) (%)				
Combined	71.2	69.4	67.2	0.888
Males	67.7	80.0	73.3	0.241
Females	74.3	59.4	61.3	0.375
Visits to Healthcare Professional				
Combined	80.3	85.5	73.8	0.268
Males	77.4	83.3	60.0	0.078
Females	82.9	87.5	87.1	0.237

P values are for comparisons among the three groups. Values in a row with differing superscripts differed significantly at p<0.05; *FBAC: foreign-born Afro Caribbeans; † USBAC: U.S.-born Afro Caribbeans; M: males; F: females ents and African American if they were born in the United States to both parents who were also born in the United States. The study protocol and informed consent were approved by the institutional review board at FIU. The study was approximately 12 months in duration.

Initially, in a pilot study, a convenience sample (different from the main population) of 10–15 Afro Caribbeans/Afro Americans from the FIU community was recruited, for validation of the research tools (Block food frequency, Baecke Physical Activity, Cohen Perceived Stress, Knowledge of CHD Risk Factors questionnaires) that were used in this study. Each participant completed a 24-hour dietary recall at the same time the Block FFQ was given. For the test-retest reliability of the Baecke Physical Activity, Cohen Perceived Stress and the Knowledge of CHD Risk Factors questionnaires, each participant completed these questionnaires a second time when they returned the first set to the investigator. The participants were also asked to complete an activity log that asked questions about type of activity during the past month. The data were analyzed and the tools adjusted, if necessary.

Data Collection and Analysis

All eligible participants, after signing of the informed consent form, completed the sociodemographic, food frequency[11-13] and physical activity questionnaires.[14,15] A diet score was devised according to whether the participants met the recommended dietary requirements for seven selected nutrients (percent energy from fat, saturated fat, dietary cholesterol, fiber, sodium, and fruit and vegetable servings) or not. Individuals who exceeded the dietary recommendations for percent energy from fat, saturated fat, cholesterol and sodium were assigned a score of 0 or a score of 1 if they met the dietary requirements. Participants who consumed less than the dietary recommendations for dietary fiber and fruit and vegetable servings were assigned a score of 0, or a score of 1 if they met the dietary requirements. These scores were summed across the selected food items to give a total diet score. The diet score ranged from 0–7. Higher scores were indicative of better-quality diets. Diet scores ≤2 were considered poor-quality diets.

The Baecke Physical Activity questionnaire[14,15] assessed sports and leisure-time activities on a five-point Likert scale, ranging from never to always or very often. For two of the most frequently reported sports activities, additional questions queried the number of months per year and hours per week of participation. For this study, we will only present information on those who did not play sports and watch television often/very often.

Weights and heights were assessed on a stadiometer using standard procedures. Body mass index (BMI) was calculated as weight (kilograms) divided by height squared (meters). BMI was used as an indicator of overall adiposity. Individuals with BMI between 18.5–24.9 were considered normal, between 25.0–29.9 overweight and >30.0 as obese.[16]

Smoking status (yes/no) was determined by two questions on the Block FFQ: "Do you smoke cigarettes

Table 2. Frequency distribution of the behavioral risk factors of participants by ethnicity and gender

Variables	FBAC*	USBAC†	African Americans	p
	N=M31/F35	N=M30/F32	N=M30/F31	
Poor Diet Score ≤2 (%)				
Combined	10.8	26.2	23.7	0.128
Males	16.7a	50.0[b]	31.0[ab]	0.030
Females	3.2	3.2	16.7	0.170
Obese—Body Mass Index ≥30.0 (%)				
Combined	7.6[a]	17.7[b]	23.0[b]	0.034
Males	6.5[a]	20.0[b]	33.3[b]	0.014
Females	8.6	15.6	12.9	0.885
Do Not Play Sports (%)				
Combined	40.9	56.5	55.7	0.137
Males	16.1	30.0	33.3	0.269
Females	62.9	81.3	77.4	0.196
Watched TV Often/Very Often (%)				
Combined	45.5	54.8	49.2	0.566
Males	41.9	60.0	56.7	0.321
Females	48.6	50.0	41.9	0.791
Cigarette Smoking (%)				
Combined	0.0	4.8	6.6	0.125
Males	0.0	10.0	3.3	0.154
Females	0.0	0.0	9.7	0.035*

P values are for comparisons among the three groups. Values in a row with differing superscripts differed significantly at p<0.05; Diet score: range 0–7, where 0 is poor diet and 7 good diet; * FBAC: foreign-born Afro Caribbeans; † USBAC: U.S.-born Afro Caribbeans now?" If yes, "on the average about how many cigarettes a day do you smoke now?"

Blood pressure was taken in the sitting position in a quiet, comfortable room following 10 minutes of rest by a trained assistant using a random-zero sphygmomanometer (Tycos 5090-02 Welch Allyn Pocket Aneroid sphygmomanometer, Arden, NC) and a stethoscope (Littman Cardiology 3M, St. Paul, MN). Two measurements were taken 10 minutes apart. Systolic blood pressure (SBP) was considered elevated if the mean of two measurements was >120 mmHg, whereas diastolic blood pressure (DBP) was considered elevated if the mean of two measurements was >80 mmHg.[17] Fasting blood glucose (FBG) was collected by a licensed phlebotomist using standard procedures after the informed consent form was signed by each participant. After the blood was coagulated (30 minutes), it was centrifuged at full speed (1,100 RPM) for 15 minutes and the serum removed and placed in labeled plastic tubes for the determination of fasting blood glucose and serum lipids. Fasting blood glucose was analyzed by enzymatic procedures using the automatic Chemistry Analyzer (Global Chemical Inc.). Fasting blood glucose (FBG) was considered elevated if >126 mg/dL. Serum lipids [total cholesterol (TC), high-density-lipoprotein cholesterol (HDL-C)] were determined[18] using the Beckman Synchron CX System (Global Chemical Inc.). Low-density lipoprotein cholesterol (LDL-C) was calculated by the Friedewald formula[19]: LDL-C = TC – (TG/5 + HDL-C). TC values ≥200 mg/dL and LDL-C values ≥130 mg/dL were considered elevated whereas, HDL-C levels <40 mg/dL, males and <50 mg/dL, females were considered undesirable.[16] These risk factors are those currently used to evaluate risk for CHD.[1,16] Serum high-sensitivity CRP (hsCRP) levels were assayed using the Food and Drug Administration-approved latex-enhanced nephelometric assays[20] on a BN II analyzer (Dade Behring). Levels of hs-CRP >3 mg/L were considered elevated.[21,22]

STATISTICAL ANALYSIS

Validation of the Block FFQ for this population was evaluated by comparing dietary analyses of the Block FFQ and the 24-hour dietary recall. Test-retest validation of the Baecke Physical Activity was evaluated by comparing the test and retest scores of the questionnaires from the pilot study. Descriptive and summary statistics were calculated using SPSS® for Windows® (version 12.0). The results were expressed as frequen-

Table 3. Distribution of physiological risk factors of the participants by ethnicity and gender

Variables	FBAC*	USBAC†	AAs	p
	N=M31/F35	N=M30/F32	N=M30/F31	
Systolic Blood Pressure ≥120 mmHg (%)				
Combined	15.2	12.9	18.0	0.731
Males	25.8	13.3	26.7	0.376
Females	5.7	12.5	9.7	0.626
Diastolic Blood Pressure ≥80 mmHg (%)				
Combined	27.3	21.0	32.8	0.335
Males	29.0	26.7	50.0	0.113
Females	25.7	15.6	16.1	0.386
Fasting Blood Glucose ≥110 mg/dL (%)				
Combined	6.1	6.5	6.6	0.993
Males	6.5	6.7	6.7	0.999
Females	5.7	6.2	6.6	0.384
Total Cholesterol ≥200 mg/dL (%)				
Combined	25.8	37.1	31.1	0.384
Males	19.4	36.7	26.7	0.315
Females	31.4	37.5	33.5	0.681
Low-Density-Lipoprotein Cholesterol ≥130 mg/dL (%)				
Combined	27.3	35.5	24.6	0.380
Males	22.6	43.3	26.7	0.179
Females	31.4	30.0	23.3	0.525
High-Density-Lipoprotein Cholesterol <40M/50F mg/dL (%)				
Combined (m/f)	39.4	35.5	29.5	0.425
Males	48.4[a]	20.0[b]	36.7[ab]	0.002
Females	31.4[ab]	50.0b	19.5[a]	0.033
High-Sensitivity C-Reactive Protein >3 mg/L (%)				
Total	10.5	8.8	26.7	0.063
Males	10.7	10.0	23.3	0.573
Females	10.3	7.4	30.0	0.138

P values are for comparisons among the three groups. Values in a row with differing superscripts differed significantly at p<0.05; * FBAC: foreign-born Afro Caribbeans; † USBAC: US-born Afro Caribbean Americans; AA: African Americans; M: males; F: females cies and percentages and compared by gender, ethnic groups and gender-ethnic subgroups. One-way analysis of variance (ANOVA) and Chi-squared analyses were performed as appropriate. Pair-wise comparisons using Bonferroni's post hoc tests were performed to adjust for multiple comparisons (FBAC versus USBAC; FBAC versus African Americans; USBAC versus African Americans). Pearson and Spearman correlations, including partial correlations to adjust for age, were also performed to evaluate associations between behavioral and biochemical risk factors for CHD. Differences were considered significant at $p<0.05$.

RESULTS

This study determined and compared risk factors for CHD in apparently healthy FBAC (residence in the United States <10 years), USBAC and African-American adults aged 18–40 years in south Florida. The high test/retest correlations of the Baecke Physical Activity questionnaire ($r=0.933$; $p<0.001$) indicated that the questionnaire was very reliable for this study population.

Significant ($p< 0.01$) differences in mean ages between USBAC (21.6 ± 3.8) and African Americans (24.4 ± 5.1) participants but not the FBAC (24.3 ± 5.8) participants (Table 1) and, between the USBAC (21.6 ± 3.6) males and African-American (25.5 ± 5.4) males but not the FBAC (24.5 ± 5.8) males (Table 1) were observed. Thus, all analyses were conducted with and without age-adjustments. However, no differences in results were noted, therefore, only the unadjusted results are shown.

The percentage of FBAC participants with poor diet score (≤2) was lower than the USBAC and African-American participants, becoming significant ($p<0.05$) between the male ethnic groups (16.7% vs. 50.0% and 31.0%) but not the females (Table 2). Significantly more African-American (23.0%) and USBAC participants (17.7%) were obese compared to the FBAC participants (7.6%), remaining significant between the male ethnic groups (33.3% and 20.0% vs. 6.5%) but not the females ($p<0.05$, Table 2). All the female smokers were African American (Table 2).

In general, USBAC and African-American participants were more likely to have elevated FBG, TC and LDL-C levels when compared to the FBAC participants, whereas more African-American participants than FBAC and USBAC participants had elevated SBP, DBP and hs-CRP values. However, the differences were not significant. The FBAC and USBAC participants were more likely than African-American participants to have low HDL-C levels. However, FBAC and African-American males were more likely than USBAC males to have low HDL-C, whereas FBAC and USBAC females were more likely than African-American females to have low HDL-C levels (Table 3).

DISCUSSION

This study investigated the relationship between risk factors for CHD in three subgroups of a predominantly black population in south Florida. The study addresses the question of (keeping race and environment constant) whether there are differences in risk factors for CHD between apparently healthy FBAC living in the United States for <10 years, USBAC and African-American adults (18–40 years) in South Florida. This is the first study presenting risk profiles for FBAC and USBAC in south Florida.

The findings of this study have shown that there are some differences in CHD risk profiles between FBAC individuals and their U.S.-born counterparts. Our study is corroborated by other studies.[7,8,9,23,39] Data from the National Center for Health Statistics[23] have shown that foreign-born persons were generally healthier than the U.S.-born population, although the health advantage varied by length of residence in the United States. They also stated that in every measure of health status, and with regard to almost every sociodemographic variable, the most recent immigrants were healthier than foreign-born individuals who have lived in the United States ≥10 years as well as healthier than the U.S.-born population. In England, there is evidence[24] demonstrating that as the length of residence of the FBAC population increases, their eating habits approximate that of the eating habits of the native-born population, whereas in Canada there is evidence[25] indicating that the prevalence of excess body weight in males and females increased from 33.5% and 17.1% (0–4 years since immigration) to 52.6% and 42.1% (≥10 years since immigration), respectively. There is evidence showing[7] 46–51% lower mortality among black migrants compared to U.S.-born black counterparts in New York City. An earlier study[9] showed that Caribbean-born blacks in New York City had substantially lower all-cause and cardiovascular mortality rates compared to blacks born in the southern and northern region of the United States. In this same study,[9] it is suggested that the risk of cardiovascular disease of foreign-born individual increases with length of residence in the United States. Data from the National Longitudinal Mortality Study (1979–1989)[8] a data set for the examination of sociodemographic and occupational factors associated with all-cause and cause-specific mortality in the United States, found that immigrants tended to have more-favorable health-enhancing behavioral habits than their U.S.-born counterparts. They also showed that non-Hispanic black migrants compared to their U.S.-born non-Hispanic black counterparts were less likely to smoke cigarettes (10.4% vs. 29.3%), less likely to be overweight (25.2% vs. 38.4%) and less likely to be hypertensive (16.8% vs. 25.5%), but more likely to have no medical insurance (40.2% vs. 34.5%).

There is a suggestion that ethnic groups within one location may adopt certain behaviors, whereas in another location this same ethnic group may behave differently,[26] indicating a geographical transition of risks[27] for CHD. Differences in demographic profiles and environmental factors as well as differences in gene frequency or expression can influence variations in CVD between different populations[26] and indeed between different ethnic groups and ethnic subgroups within the same population. For example, in the Ni-Hon-San study of Japanese migrants, low TC and CHD rates were seen in Japanese men in Japan, whereas intermediate and high TC levels and CHD rates were seen in Honolulu and San Francisco, respectively.[28] In England, comparisons of Afro Caribbeans, South Asians and Europeans showed marked differences in central obesity, glucose intolerance hyperinsulinemia and elevated dyslipidemia, despite having similar blood pressure, BMI and TC.[29] Additionally, a study of individuals of West African Ancestry in Africa (Cameroon), the Caribbean (Jamaica) and England (Manchester) showed the prevalence of diabetes mellitus and hypertension was lowest in rural Cameroon and highest in Manchester.[30-33] Thus, behavioral activities and culture rather than differences in genetics and clinical factors between foreign-and U.S.-born individuals may in part be explanatory for differences in CHD mortality between foreign- and U.S.-born individuals.[8,9,23]

Limitations and Future Directions

The participants, in answering the self-administered questionnaires and receiving information on their health profile, were more aware of their health status, and this may provoke them to address health issues of concern to them. The self-report nature of some aspects of the data collection process, such as cigarette use in our young adult population, may be reported with less accuracy[34] and raises the possibility of recall bias. However, our results showed that a majority of the participants were knowledgeable about cardiovascular disease and the test-retest results of our questionnaires have shown high correlation, thus we are not aware of any evidence of systematic biases associated with recall of information in our study. To reduce information bias in this study, one investigator, using standardized and validated instruments, collected and analyzed the data. To reduce self-reporting biases, assurances of confidentiality were given to the participants in order to encourage truthfulness. Accuracy of their responses on the questionnaires was encouraged, as the participants were informed that they would receive a health profile and that for the information to be helpful to them, the accuracy of the information they provided was of vital importance. To minimize data abstraction bias, all data was entered into SPSS version 12.0 by one investigator and the data checked for anomalies in order to ensure consistency. Our research design was cross-sectional and, with this small sample size, we may not be able to generalize our results beyond these ethnic-cultural groups from south Florida. The FBAC and USBAC populations comprise different groups such as Jamaicans, Haitians, Trinidadians, Barbadians and others from the English-speaking Caribbean. These different groups of individuals may have different socioeconomic backgrounds and behavioral habits. Thus, future research should investigate risk factors for CHD in the different Caribbean groups living in the Caribbean and compare these risk factors with U.S.-born counterparts over time.

The term "African American" or "black" has been used interchangeably to describe all black people living in the United States.[35] Such broad categorization of individuals does not take into consideration the existence of subgroups/cultures within this black population. These subgroups/cultures may be composed of varying numbers of foreign-born individuals. Also, individuals of this black population may share some sociodemographic and genetic characteristics. Thus, differences in attitude, knowledge and behaviors could be some of the disposing factors leading to differences in some of the risk factors for CHD within the subcultures of this black population.[36] Thus, it may be of vital importance to health policy planners and healthcare providers in the United States to monitor the health status of immigrants, especially as the population of immigrants increases.[23] The challenge of preventing CHD in this population lies in identifying and addressing the components of CHD most relevant to each ethnic group.[26]

Research is required to elucidate the various mechanisms for the differences in health behaviors between foreign- and their U.S.-born counterparts. Additionally, research should examine screening for multiple behavioral and metabolic risk/risk factors in other racial/ethnic cultural groups and subgroups with respect to geography (geographical transition of risks) and other behavioral factors such as sleep,[37] working at home/housework and visits to healthcare professionals. Also, research on the behavioral activities of immigrants in the United States versus their activities in their country of birth may help us better understand the geographical transition of behavioral and other risk factors for CHD in this and other ethnic populations. It is suggested that we should also investigate individuals who adhere to multiple health behavior recommendations, as this might help us to understand the mechanisms that influence such behaviors.[38] This might be helpful in the design of programs that will encourage healthier behaviors in this and other populations.

Putting the spotlight on the ethnic and cultural differences in a population can help us understand better the variations in health among different ethnic and cultural groups. This focus can provide healthcare professionals with the opportunity to develop culturally sensitive nutrition/health programs and strategies for the improvement of health outcomes.

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